

Potential Impact of Augmented and Virtual Reality Technology in the Control Center

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MACRO a division of Ross & Baruzzini

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Overview

- Introducing Future Technologies
 - Augmented Reality
 - Virtual Reality
 - Artificial Intelligence
 - Drones
- Uses of Future Technologies
 - Applications in Transportation
 - Current explorations
 - Future possibilities
- Future Technologies in Control Centers
 - Impact of AR & VR on Control Center Design
 - Affect of future technologies on co-location

Artificial Intelligence

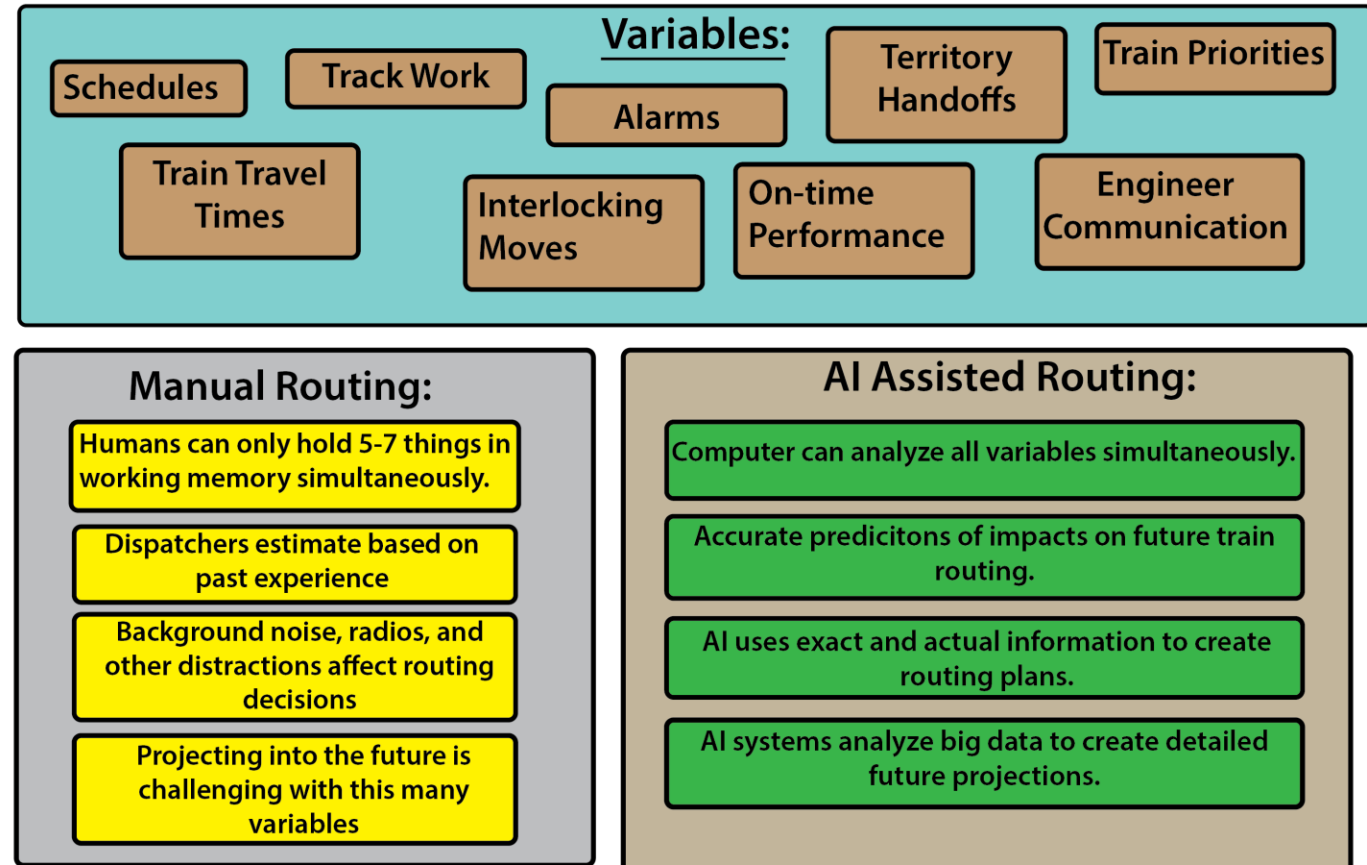
- Machine Learning programs “Learn” how to process, organize, or analyze data with limited guidance from humans.
- Artificial Intelligence systems are able to process complex problems similar to a human brain.
- Artificial Intelligence enables increased automation of complex tasks that could previously not be automated.



Artificial Intelligence in the Control Center

- AI can analyze far more data simultaneously than a human can
- Combining AI with Natural Language processing enables a sophisticated voice command/control system
- AI can coordinate across modes to improve service efficiency

Train Routing Decisions:



Augmented Reality: Introduction

- Augmented Reality overlays computer-generated imagery onto the “real world”.
- Augmented Reality is typically done using either smartphones or headsets



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Augmented Reality in Transit: Current Explorations

- Remote Maintenance
 - AR is used to allow remote technicians to overlay important information on the view of a field technician
 - Thales Eye
 - Keolis AR maintenance pilot
- Training
 - Rockwell-Collins Coalescence Mixed Reality Training System
- Construction
 - Visualizing buried Utilities using AR (NCHRP Idea Project 167)
- Control Centers
 - Clarity Mixed Reality Platform
 - MACRO currently has a proposal under review with the Transportation Research Board to explore using AR for train dispatching
 - Challenges with implementation

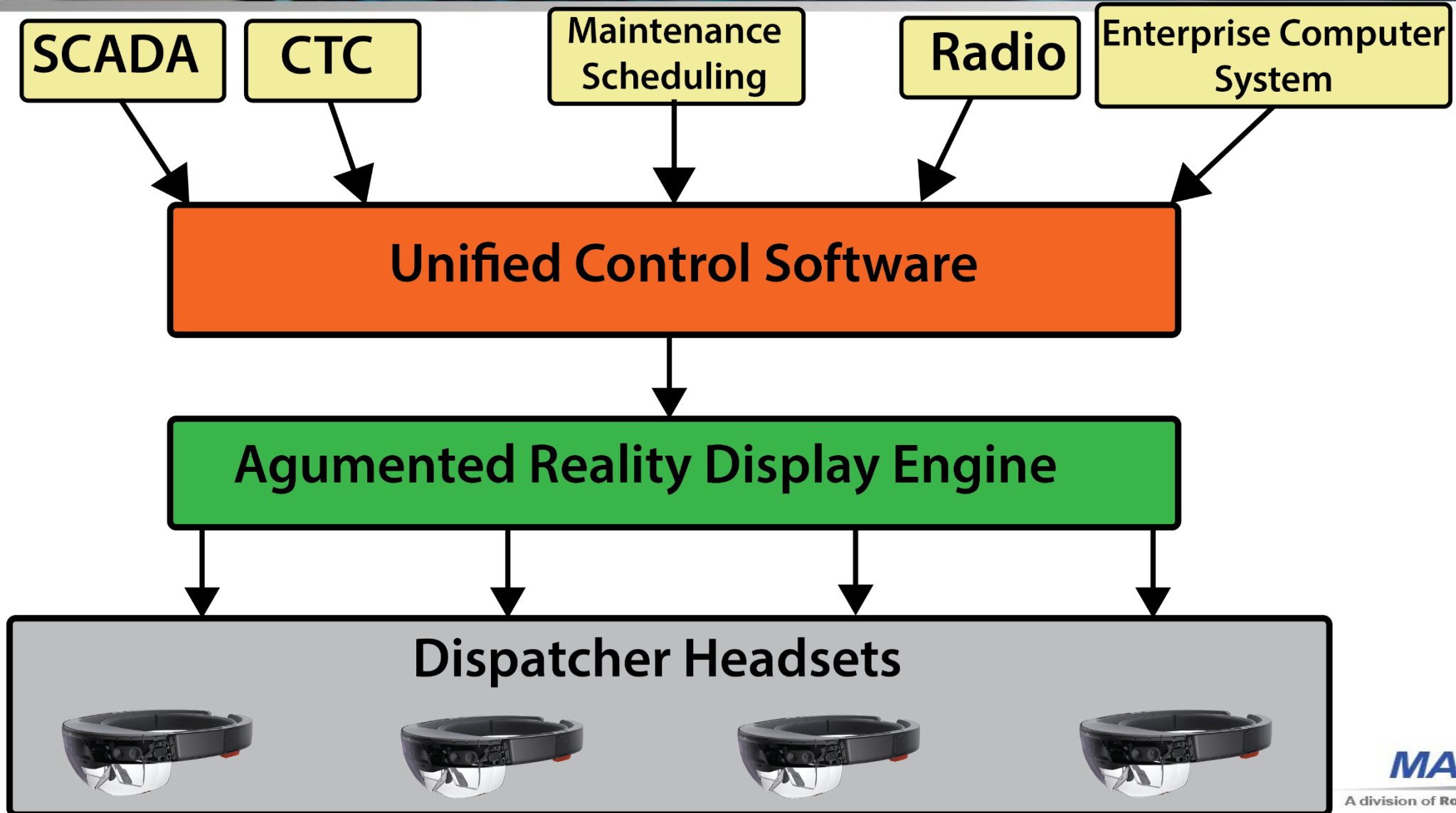
Clairity Mixed Reality Platform



MORE VIDEOS

Image source: 360.world/clairity

Augmented Reality in the Control Center



Augmented Reality in the Control Center

Existing Control Centers:

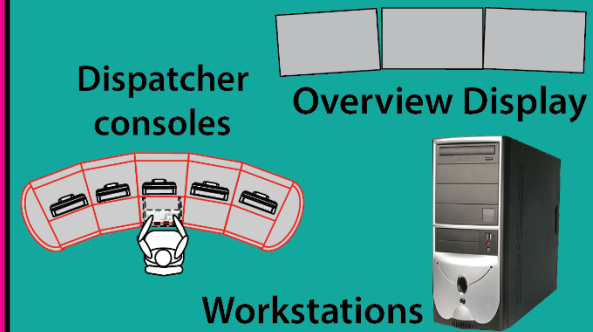
Backup Control Room:



Server Room:



Control Room:



Augmented Reality Control Centers:

Backup Control Room:



High-Speed Data Connection

Server Room:



High-Speed Data Connection

Control Room:



Virtual Reality: Introduction

- Virtual Reality(VR) is the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way
- VR uses headsets connected to powerful computers to generate the imagery



Virtual Reality in Transit

- Virtual Walk-throughs
 - Use VR to create a virtual “walk-through” of building projects
- Immersive Training Simulations
- Virtual Reality Control Centers
 - Bring together different operational groups virtually instead of physically



Drones

- Current and Potential uses:
 - Track inspection
 - Infrastructure inspection
 - Incident response
 - Parking monitoring
- AI Enhanced processing of drone data
- Remote operation enables drone control centers
 - Virtual Reality creates immersive remote control experience
 - Track Maintainers could use VR for Track Inspection



Impact of Future Technologies on Operations

- Artificial Intelligence is the future technology likely to have the largest impact on operations
 - AI could increase automation, changing the productivity levels of employees
 - AI could take over many current job tasks, leading to a change of jobs roles for operations staff
 - AI will assist with data visualization in AR and VR
- Augmented and Virtual Reality could impact the layout and organization of control centers, and visualization of information
- Process for implementation is undefined
- Backup Control Centers
- The true impact of these technologies can only be guessed at today

Future Technologies and Co-Location

- Augmented and Virtual Reality could enable “virtual co-location”
 - Maintain existing physical presence and infrastructure while providing co-location advantages
- Physical layout and console designs will be impacted by new technologies
- Artificial Intelligence could improve and automate information sharing between operating groups
- Drones could be another operations group to be brought into the centralized control center

Thanks for listening!

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